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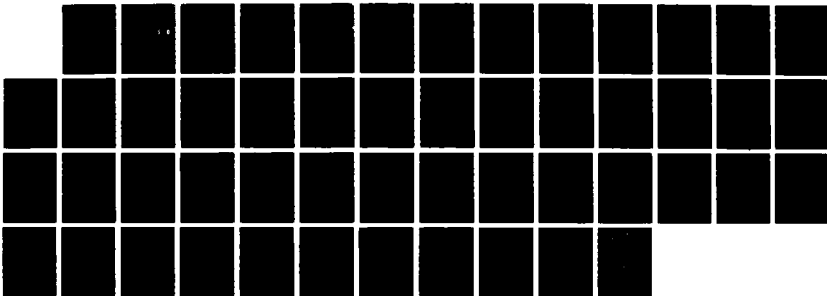
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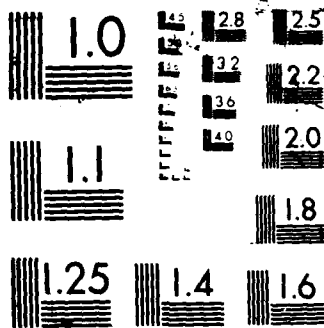
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The Soviet Air-to-Air Threat:  
Are Theater Airlift Aircraft Vulnerable?

by

Major Blaine W. Hyten  
USAF

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APR 05 1988  
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School of Advanced Military Studies  
U.S. Army Command and General Staff College  
Fort Leavenworth, Kansas

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## 19. ABSTRACT

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### Abstract

The Soviet Air-to-Air Threat: Are Theater Airlift Aircraft Vulnerable? by Major Blaine W. Hyten, USAF. 44 pages.

Theater airlift aircraft play a critical role on the modern battlefield for both the Army and the Air Force. The Soviets now possess an impressive array of aircraft, both fixed wing and helicopters, armed with air-to-air weapons that pose a significant threat to theater airlifters. The Air Force does not possess sufficient fighter assets to escort every theater airlift mission in a conflict with the Soviet Union. Theater airlift crews need to be aware of the threats and where they are vulnerable to them. These threats need to be recognized and addressed if theater airlifters are to survive on a mid-to-high intensity battlefield in the future.

This monograph examines aerial theory and several historical examples as they relate to this threat to airlift. It briefly looks at the aircraft and employment of theater airlift aircraft and the Soviet aircraft that could be arrayed against them. This paper poses various mission scenarios to illustrate where airlifters are vulnerable to specific threats.

This study concludes by stating that there is clearly a significant air-to-air threat to theater airlift aircraft from Soviet fixed and rotary wing aircraft. It reaffirms the logic for Soviet targeting of airlifters and briefly addresses possible countermeasures. The critical issue is the need to recognize the range of threats and the value of addressing them.



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## I. Introduction

The primary purpose of this paper is to explore the nature of the Soviet air-to-air threat to U.S. Air Force theater airlift assets. The general setting is a mid-to-high intensity conflict but no level is excluded since an unprotected transport can fall prey to one of these threats wherever they appear in any level of conflict. The threat, besides being Soviet, may also come from a Soviet trained and equipped force. There is certainly no shortage of such forces in the world today. Soviet fighters have long been a serious threat, but recent increases in capabilities and numbers has dramatically increased that threat. Although helicopters are not new to the battlefield, the Soviets are making them a new factor in aerial warfare. Theater airlift aircraft in the environment of AirLand Battle are now subject to an expanding host of air-to-air threats.

These threats are a serious problem since airlift plays such an important role in today's warfare. Theater airlift is a key player in the Army's AirLand Battle and is an element of the major Air Force mission of airlift. It provides a rapid means of regular and emergency resupply as part of the logistics effort. Troops and equipment can be rapidly shifted to meet new plans or threats. Theater airlift is the primary delivery mode for Airborne and Ranger forces and it provides an emergency transport capability for tactical nuclear weapons. These capabilities make theater airlift essential for U.S. forces and a worthwhile target for Soviet air combat assets.

The U.S. no longer has the counter-air edge we had in the past. Soviet fighter numbers and capabilities can clearly challenge U.S. or NATO control of the air in a mid-to-high intensity conflict. The result is that theater airlift aircraft will have to rely more on protection from general air cover than on dedicated fighter escort except for the highest priority missions. The norm will be the self protection measures of low altitude tactics and flying at night or in adverse weather. Less direct protection means greater vulnerability for these limited assets and their valuable crews and cargoes.

The Soviet air-to-air threat to theater airlift aircraft is viable with current systems. Their air-to-air weapons are approaching U.S. levels of sophistication and the Soviets have no shortage of fighters on which to mount them.<sup>1</sup> There are also indications that they are preparing to deploy helicopters with air-to-air weapons and sophisticated capabilities.<sup>2</sup> Since the capability to attack an aircraft does not assure that attack, the logic for the attack must also be present.

The Soviets will target theater airlift because of its resupply and troop transport capability and as a link in the nuclear delivery chain. The specific threat will come from tactical aircraft performing interdiction, "free hunting", and armed reconnaissance missions. Airlifters will probably be targets of opportunity for the first two missions. However, armed reconnaissance is directed at disrupting resupply and troop movement operations<sup>3</sup> which are both theater airlift missions. Therefore tactical aircraft conducting armed reconnaissance will

be hunting for airlifters conducting those missions.

The effects of this threat are significant to both the Air Force and the Army. If the threat proves significant enough, a limited Air Force asset is in potential danger. That applies to the crews as much as to the aircraft they fly. Highly trained aircrews are both valuable and costly to replace. The Air Force cannot afford the loss of aircraft and crews to an unanticipated threat. The significance for the Army revolves around what theater airlift provides for AirLand Battle. The danger is the restriction of tactical air resupply and mobility as well as a serious challenge to the use of airborne forces.

There is also a serious ground-based air defense threat that will affect theater airlift aircraft. However, this paper concentrates specifically on the air-to-air threat. Therefore, ground air defense systems, SEAD, J-SEAD, and other air defense suppression efforts are beyond the purview of this monograph and will not be addressed here.

The monograph starts with air-to-air theory as it relates to theater airlift followed by a look at several historical examples where hostile fighters attacked airlift aircraft. Next, this paper will examine U.S. and Soviet aircraft and tactics involved in this problem. The primary issue is addressed by projecting scenarios and envisioning the types of threats in various mission stages. In conclusion, this monograph will evaluate the extent of the threat and briefly suggest possible options for addressing it.

## II. Air-to-Air Theory and Doctrine

Air-to-air theory developed more as a result of actual practice in World War I than from theoretical speculation before the war. With only eleven years between the first flight and the beginning of World War I, employment theory for aircraft was limited by new and evolving combat capabilities. The first aircraft missions in that war involved reconnaissance, with thoughts of air combat coming from the obvious need for each side to deny that capability to the other.<sup>1</sup> The aerial warfare theorists began publishing their works in the early 1920's. They based their theories on observations of the war combined with imaginative projections of aircraft potential.

Much of the effort was directed at the various missions air forces could perform such as bombing, pursuit, reconnaissance, and air support. Control of the aerial environment was a critical factor which allowed all other missions to occur so it received much attention. Each theorist addressed different aspects of these issues, but air superiority was the key to each.

When the subject of aerial theory arises, the name of Giulio Douhet undoubtedly comes to mind. The first point in Douhet's recapitulation of his ideas on air power is:

"The purpose of aerial warfare is the conquest of the command of the air. Having the command of the air, aerial forces should direct their offensives against surface objectives..."<sup>2</sup>

In Douhet's famous book, The Command of the Air, first published in 1921, he laid out his basic theory concerning the use of air power. He was best known as a proponent of strategic bombing and

an independent air force. The primary mission carried out by that air force was strategic bombing, which was permitted through command of the air. Clearly for an air force to accomplish any of its other tasks, control of the air was essential.

Although theater airlift did not exist in Douhet's day, it is a significant element of ground forces operations today. Douhet considered command of the air essential to both ground and sea operations:

"The primary concern of the army and the navy should be to see that their own aviation conquers the command of the air; otherwise all their actions will be put in jeopardy by an enemy in command of the air." <sup>3</sup>

The implication is that, without command of the air, theater airlift functions are in danger from an opposing air force.

The famous and controversial Billy Mitchell was a pioneer air theorist whose contributions to aviation are significant. Based on his World War I experiences, Mitchell was an ardent supporter of a separate air force and published much of his work in the early to mid 1920's. He had been influenced by Douhet and became a believer in strategic bombing. A clear difference from Douhet was Mitchell's contention that to allow bombing, a majority of the air force should be pursuit (fighter) aircraft whose mission would be aerial mastery.<sup>4</sup> He specifically stated in his book Winged Defense:

"The only defense against aircraft are other aircraft which will contest the supremacy of the air by air battles. Great contests for control of the air will be the rule in the future. Once supremacy of the air has been established, airplanes can fly over a hostile country at will." <sup>5</sup>

Although he did not then foresee large scale transport operations or integrated ground-based air defense systems, it is clear he felt that the power with air supremacy could conduct any desired operation.

Claire Chennault, of Flying Tiger and China fame, made his contributions to air theory during his years as an instructor at the Air Corps Tactical School at Maxwell Field, Alabama.<sup>4</sup> Concentrating on the concepts of defensive control of the air, he stated:

"My experiences in Hawaii convinced me that an air force could never get along without fighters and that in any future war they would play as vital a role as bombers. The principle involved was that there ought to be some means for opposing any hostile offense with an active, effective defensive weapon."<sup>7</sup>

Again, the implication for transport aircraft is that, just like bombers, they should be protected by fighters controlling the airspace.

With the approach of World War II, more solid doctrine evolved from theory through the writings of Major General H.H. Arnold and Col. Ira Eaker. Both men became famous in the war's air operations, but in 1941 they were making observations based on the Battle of Britain. Arnold and Eaker had clearly recognized the value of the pursuit aircraft. In 1941 they wrote:

"It is now fairly generally agreed that no land...battle will be won where the enemy holds superiority in the air and when he is able to bring a considerable air pressure to bear on the theater of that battle."<sup>8</sup>

They also specifically addressed transport operations in light of European experiences in the war.

They noted that transports had been either flying over enemy

territory in the dark or staying over home territory under friendly fighter cover.<sup>9</sup> The authors plainly felt the need to protect transports or they would be vulnerable to "air pressure" from a hostile air force.

Although Clausewitz had no inkling of the airplane or airpower, several of his points are pertinent to the conduct of aerial combat. In chapter 2 of Book 1, he states that, "The fighting forces must be destroyed: that is they must be put in such a condition that they can no longer carry on the fight."<sup>10</sup> The concept of air superiority fits into this very nicely. In gaining air superiority, the enemy's air fighting forces are put in a situation where they can not effectively carry on their fight. In that same chapter, Clausewitz says, "Combat is the only effective force in war; its aim is to destroy the enemy's forces as a means to a further end."<sup>11</sup> The objective of air-to-air combat is to destroy enemy aircraft, which is a step towards air superiority. In that respect, the ends of the air war become a means in the quest for final victory. He expands that in Book 7, The Attack.

In chapter 6 of Book 7, Clausewitz again addresses destruction of the enemy's forces. "Destruction of the enemy's forces is the means to the end."<sup>12</sup> He further categorizes that by specifying different points of view. The third of four is, "The preservation of one's own fighting forces as the dominant consideration."<sup>13</sup> Again, air superiority is achieved by destroying the enemy air force, not by out-maneuvering him.



One of the major benefits of air superiority is the ability to employ one's air force without danger of losing aircraft to hostile action. That is clearly preservation of your own forces as a result of the air superiority effort. Air superiority allows theater airlift missions and protects those assets. Preservation of those resources is plainly one of the dominant considerations, particularly on the modern battlefield.

The aerial combat doctrine concerning the fighter or pursuit mission for U.S. forces has maintained its air superiority emphasis since it was first espoused in 1918. Based on World War I experience the pursuit mission was defined, "as keeping a specified area of the sky clear of enemy planes." <sup>14</sup> In a 1940 Air Corps manual on aerial combat, the pursuit mission was to, "deny the hostile air force freedom of the air." <sup>15</sup> The most current Air Force doctrine is also clear on the subject, stating, "The first consideration in employing aerospace forces is gaining and maintaining the freedom of action to conduct operations against the enemy." <sup>16</sup> Both theory and doctrine for aerial combat have emphasized air superiority from the beginning. Air-to-air combat is one of the primary methods to achieve that. Without it, the freedom to conduct air and ground operations, including theater airlift, does not exist. Soviet aerospace doctrine, while different in execution, also aims at control of the aerospace environment to deny the enemy freedom to conduct missions. More importantly, they appear to be resourced to execute their doctrine.

### III. Historical Examples of Airlift Operations

This section examines several historical examples during World War II where airlift aircraft were attacked by hostile fighters. The purpose is to show that airlifters were vulnerable in varying air superiority conditions. The airlift concept was just evolving during World War II and the impact of fighter interdiction varied from severely damaging the effort to shifting routes and flight times. Gaining air superiority became a major factor in conducting airlift missions in Burma. Airlift aircraft in World War II were slow, unarmed, and clearly vulnerable. Modern airlifters are also relatively slow, still unarmed and therefore vulnerable when not closely protected.

Maj. Gen. Arnold and Col. Eaker noted in 1941 that:

"A type of aircraft coming into new prominence because of the appearance of parachute troops and the prevalent tendency toward troop transport and troop supply by aircraft, is the cargo or transport plane." <sup>1</sup>

Most early military transports were military versions of civilian airliners so the idea of moving people and cargo by aircraft was not new in itself. The transition to combat operations was a natural evolution. During the Spanish Civil War, Germany accomplished one of the first airlifts of the era when JU-52 transports airlifted critical troops from Africa to Spain for General Franco.<sup>2</sup> World War II had many theater airlift operations, but few encountered a significant hostile air threat.

One of the most significant airlift efforts of World War II was conducted by the German Luftwaffe to sustain the 6th Army in Stalingrad. Over the objections of his subordinates, Luftwaffe

chief Hermann Goering pledged to Hitler that his forces could supply the 6th Army by air. For the ordeal which began in November 1942, Goering's senior staff officers determined that the 6th Army needed 600 tons of supplies per day. Air transport was the only viable solution, if any existed at all, and 300 JU-52's would be needed to meet that goal.<sup>3</sup> The rugged JU-52 had a cargo capacity of 2.5 tons. It met the required tonnage but its 150 mile per hour speed was slow<sup>4</sup> and that made it an easy target for fighters. Even in the planning phase, planners had doubts about that number of transports being able to do the job. Not all of the 300 JU-52's were available and attrition considerations were made, not only for maintenance, but also for those shot down by Soviet fighters.<sup>5</sup> Soviet fighters became a major threat to an already questionable operation.

When the ill-fated airlift began, the Soviets rapidly gained local air superiority.<sup>6</sup> This was the first time Soviet air units began sustained offensive operations and a primary task was to intercept transports resupplying the 6th Army.<sup>7</sup> They succeeded. The Luftwaffe ultimately committed 850 aircraft to the supply effort, including other types of transports and even converted bombers.<sup>8</sup> They were still only able to average 100 tons per day between 22 November 1942 and 16 January 1943.<sup>9</sup> By January 1943 the situation had grown progressively more grim for the airlift as Russian fighters claimed growing numbers of transport kills.<sup>10</sup> A German officer noted, "They have absolute air superiority here, day and night, nothing but those rapacious birds." <sup>11</sup> Virtually

every mission was threatened. Aircraft were even threatened on the ground in Stalingrad as, "Soviet fighters swooped overhead ready to pick off the unwieldy German transports as they came and went...." <sup>12</sup> Consequently the airlift failed and the fate of the 6th Army is well known.

Stalingrad presents the best example of where an airlift was the only hope and it failed with predictable results. The Soviet aerial effort contributed mightily to that failure. Given Soviet air superiority and insufficient escort, the airlift crews "faced the withering fire of coordinated attacks by Soviet combat aircraft and ground fire into and out of the pocket." <sup>13</sup> German figures show transport losses of 479 of 850 aircraft, including 266 JU-52's. <sup>14</sup> That was 1/3 of their 750 transport aircraft force at that time. <sup>15</sup> The Soviets clearly targeted the transports, dramatically showing their vulnerability. It was a doomed operation whose fate was sealed by the Red Air Force.

The most continuous and vital airlift operation for American forces in World War II was carried out by Air Transport Command over "The Hump" from India into China. That operation started on April 8, 1942, <sup>16</sup> and continued beyond the end of the war. It was virtually the only supply line into China after the Japanese cut the famous Burma Road in June, 1942. <sup>17</sup> As the only sustainment link for Allied forces in China, it would have been a severe blow if it had been cut. Initially the airlift was carried out, "in the face of superior Japanese air strength" <sup>18</sup> The Japanese made efforts throughout the war to interdict the aerial supply line, but they were operating from Burma and that was not a

primary theater for them. Japanese air strength gradually weakened as the war went along, and U.S. air efforts increased proportionately.<sup>19</sup> The specific air threat to Hump transports shows their vulnerability to hostile air action.

Japanese attacks on the transports were more frequent in the beginning, but occurred as long as there were Japanese aircraft in Burma. Most of the losses were due to weather and aircraft malfunctions but even occasional Japanese fighter attacks were a real danger. There were several reports of dramatic escapes from Japanese fighters, but those only came from survivors since the transports normally flew alone. Japanese air had a clear effect on the Hump operation.

The original routing was well north of the lower, safer area of the mountains in order to keep the transports a safe distance from Burma based Japanese fighters. In late 1943 the Eastern Air Command even admitted in a dispatch:

"The Japanese Air Force, in fact, controlled the air over Burma and, while maintaining a constant threat against the vital air route to China, was harassing Allied ground and air installations..."<sup>20</sup>

It was not until the late summer of 1944 that the routes further south over better terrain could be used. There was still danger from enemy fighters based in Burma, whose primary mission was to interfere with air operations out of India.<sup>21</sup> However, by that time, Allied forces had virtually achieved full superiority over Japanese air forces in the region<sup>22</sup> and the danger was minimal. Had Japanese efforts against the Hump airlift been more intense they might have cut off supply to Stillwell's forces in China.

leading to their withdrawal or defeat.

The China-Burma-India Theater in World War II provided the most active use of airlift to sustain Allied forces and defeat the Japanese. The overall air effort in that theater, particularly Burma, was integral to the Allied effort. Field Marshall Slim was a true master at integrating air, and particularly air transport, into his operations in India and Burma. He specified that, "A most distinctive aspect of our Burma war was the great use we made of air transport." <sup>23</sup> He was also careful to clarify the conditions he felt were best for its employment:

"Until a degree of air superiority, amounting at least locally to dominance, had been secured, neither air supply, movement, or tactical support could be carried on with the certainty and regularity our operations demanded." <sup>24</sup>

Japanese control of the air in Burma did not stop air transport operations, but it did cause extra efforts to be taken through March, 1944. The ascendancy of Allied air superiority then began impacting the air situation. During March, 1944 the Japanese were unable to prevent the Allies from "maintaining whole divisions by air supply" but they still had a potent air force.<sup>25</sup> By June of 1944 the Allies controlled the airspace over the battlefield which not only allowed them to fly in complete units, but also prevented the Japanese from conducting aerial resupply.<sup>26</sup> It is not difficult to imagine the impact if the Japanese had diverted more air effort to that theater to give them the air superiority they often held in 1941 and 1942.<sup>27</sup> Since they did not, two British generals (Slim and Giffard) were

able to use strategic mobility from air transport to the maximum.<sup>29</sup> Air transport operations became an integral part of combat operations throughout the theater.

There is one recent example of a C-130 being destroyed in aerial combat. It occurred on June 1, 1982 in the Falklands War.<sup>29</sup> The Argentinian transport aircraft flew extensive support operations during the Falklands War with their C-130's providing the major effort.

Their major operations were at night and at extremely low altitudes to avoid interception,<sup>30</sup> much as U.S. operations would occur in a questionable air environment. The C-130 that was shot down was flying in daylight, but the weather was, "dull and overcast, and the poor weather provided excellent cover for the Argentine transport aircraft running the blockade to take supplies to Port Stanley." <sup>31</sup> This particular C-130 exposed itself to British radar and had fighters vectored after it.<sup>32</sup> It was destroyed by missiles and cannon fire.<sup>33</sup>

This incident shows the vulnerability of the C-130, the primary U.S. theater airlifter, once it has been discovered. There is a clear implication in this incident for airlift aircraft flying unprotected in a high aerial threat environment. The Argentinians had no defensive measures on the aircraft. Neither do U.S. airlifters.

Examples of airlift actions for U.S. forces in Europe during World War II and since demonstrate the success of airlift in conditions of air superiority. The airborne operations in Normandy and Holland were unchallenged in the air, eliminating

a serious headache for the planners. U.S. airpower in Korea and Viet Nam was supreme and there was virtually no challenge to airlift operations from aerial threats. Current airlift doctrine and practices have been developed in the absence of any recent experience with other than simulated threats and a recent history of air supremacy. If theater airlift is to be effectively employed in a high aerial threat environment any time in the near future, there is the need to meet the pre-condition of air superiority or risk losing those assets as currently equipped.



#### IV. Air Force Theater Airlift

Current theater airlift doctrine states that the mission "is performed within a theater of operations and supports theater objectives through the rapid and responsive movement of personnel and supplies." <sup>1</sup> Specific tasks accomplished include deployment, employment, redeployment, logistic support and aeromedical evacuation. These are performed using the airland, airdrop, or extraction modes for delivery and airlanding for evacuation or onload.<sup>2</sup> Air Force doctrine does not limit these missions to a location in the combat zone since where the missions occur is determined by the ground forces.

Theater airlift tactics specify mission profiles based on the anticipated threat, but key on the ground-based threat. Tactical missions are flown single ship or in formation depending on the mission. Low altitude routes are planned to take advantage of terrain masking and to avoid threats. Night and adverse weather is beneficial to airlifters since the aircraft can operate in those conditions and threats are degraded. Careful planning and coordination is required for a preplanned mission and timing is critical since most missions have a narrow delivery window. While some altitudes and speeds vary by aircraft, tactical employment of the assets is basically the same.

The C-130 is the primary theater airlifter but the theater airlift mission is defined by where it is performed and who it supports. The other major airlift aircraft are the C-141 and the C-5. Both are primarily strategic airlift assets with a

theater airlift capability, particularly the C-141. The new dual capability aircraft is the C-17, which is being built to perform strategic and theater functions. The specific aircraft concerned in this paper are the C-130, the C-141, and the C-17.

Specific theater airlift missions require examination to determine where the aircraft are vulnerable to the threat. Clearly, the major threat will be to aircraft operating in the more forward areas of a theater, particularly in the immediate area of the FEBA. However, the Soviet concept of deep operations and intermixed forces includes the use of air assets and the possibility of finding Soviet tactical aircraft in the rear of the theater can not be discounted. For the Air Force, current concepts are for routine operations to the division rear, with airdrops as far forward as company battle positions not being uncommon.<sup>3</sup> A new possibility which has come about with AirLand Battle is friendly insertion and sustainment of deep operating ground forces.<sup>4</sup> The specific delivery mode will depend on a number of factors including the threat, the cargo, the urgency of the mission, and the availability of drop zones or airfields.

Airland missions are the preferred method for delivering the full range of cargoes carried by Air Force theater airlift aircraft including the C-130, C-141 and C-17. This type of mission allows the largest cargoes and personnel loads with the greatest amount of unit integrity and the least potential damage. It requires an airstrip of some sort, but a 3000 foot dirt strip, appropriately marked, is the minimum requirement for C-130's and C-17's. With an air threat present, this type of mission is

vulnerable in the approach to landing and takeoff phases where any aircraft is slow, configured, and relatively unmaneuverable. For several minutes in each phase, the aircraft is a clear target for hostile aircraft that can evade or surpress air defenses around the airfield.

Airdrop missions (excluding Airborne missions) encompass delivery modes using parachutes. The C-130, C-141 and C-17 all have this capability. The loads are more limited than for airlanding because of the rigging and packaging required. Airdrop is used when a suitable airfield is not available but a drop zone is. Specific modes include primarily Heavy Equipment and Container Delivery System drops. Since airdrops are not as precise as airlanding, greater dispersion of loads and possible damage is expected.

In these delivery modes, whether in a formation or single ship, the run-in, drop, and escape phases are the most vulnerable to air attack. From an Initial Point inbound to the drop zone, aircraft must slow down, line up on the drop zone, reach drop altitude, configure for the drop, and reach final drop speed. The run across the drop zone is critical for positioning, altitude and airspeed. Those phases, with the aircraft again slow and configured for airdrop, are extremely vulnerable to aerial threats. This is even more evident when maneuvering violently to evade an attack endangers the entire mission.

Airborne operations, although similar to airdrop missions, are really separate because of special planning considerations

and often unique objectives. The aircraft involved include the C-130, C-141 and C-17. As theater airlift missions, these operations primarily concern Airborne, Ranger, and SOF units, an integral part of AirLand Battle. While these missions can be performed single ship, formations are commonly used. This aids in placing sufficient combat power on the ground simultaneously and keeps relative unit integrity. Such operations do not usually occur in low threat areas due to the nature of airborne forces.

The phases of an airborne drop are almost the same as for an airdrop mission. The speed for the drop is slower and aircraft positioning for the drop is even more critical both for jumper safety and unit positioning on the ground. Again, with the aircraft slow and configured for drops, it is a vulnerable aerial target in a normally high threat area. An added factor is the value of airborne forces as a priority target which is better destroyed in the air than on the ground.

Extraction, the Low Altitude Parachute Extraction System (LAPES), is the final delivery mode used in theater airlift missions. The C-130 is the only current airlifter with this capability, but the C-17 will also have it. It is the least commonly performed mission as it is both dangerous and has a limited delivery capacity due to loading and rigging requirements. It is accomplished single ship and requires an extraction zone. This method has virtually the same vulnerabilities in its approach, extraction, and escape phase as an airdrop, but any distraction for the crew from the time they enter the extraction

phase through departure can be fatal. Again, this method places an airlift aircraft in a highly vulnerable mode during the critical phase of the mission.

Looking at both the aircraft involved and the theater airlift missions, it is clear that there are several critical and vulnerable phases for each delivery mode. Formations add to this vulnerability by further restricting options for individual aircraft. With current equipment, formations can be flown in day, night, or adverse weather. The last two add significantly to the crew work load and concentration making them even more vulnerable to unobserved interception and increasing the requirement to maintain formation parameters. With theater airlift providing a significant degree of flexibility and maneuverability to commanders on the AirLand battlefield, these vulnerabilities could provide a significant opportunity for a Soviet force to interdict our capabilities or slow our tempo of operations.

## V. Soviet Air-to-Air Threat to Theater Airlift

There are a number of Soviet aircraft, both fixed and rotary wing, which have both missions and weapons that pose a threat to unprotected aircraft. The Soviets have built an extensive air support system totally linked to the overall ground effort and they have been making dramatic improvements in the capabilities of those aircraft. They also believe in an independent air force mission to gain air superiority.<sup>1</sup> For close air support and anti-tank strikes, the Soviets favor helicopters in close and fixed-wing aircraft for deep strikes.<sup>2</sup> The Soviets view air strikes as an extension of fire support and will employ them extensively in the immediate area of the FLOT.<sup>3</sup> Air-to-air fighters will also be found operating in the FLOT area since the Soviets use them to protect ground attack assets.<sup>4</sup>

Currently deployed Frontal Aviation fighter aircraft are modernized or new generation and supersonic. Each front commander has an air army for his own air assets and they can be expected to operate in his area which can be up to 300 kilometers wide and 500 kilometers either side of the FLOT.<sup>5</sup> The Frontal Aviation counter air fighters will be the primary threat to theater airlift aircraft in our own rear areas.

The primary Soviet fighters considered for this paper are the MiG-21 Fishbed, the MiG-23 Flogger, the MiG-29 Fulcrum, the MiG-31 Foxhound, and the SU-27 Flanker. Each of these aircraft is armed with air-to-air missiles<sup>6</sup> and is either a Frontal Aviation asset or could be used as one during wartime. The Fishbed and

the Flogger make up the majority of the current front line fighter force and have night/all-weather capabilities.<sup>7</sup> The Fulcrum, Foxhound, and the Flanker are the latest generation fighters and their look-down/shoot-down capability,<sup>8</sup> in addition to sophisticated radars, makes them formidable counter air fighters. The look-down/shoot-down system is a serious threat to theater airlift aircraft and the Fulcrum is deploying with it to Frontal Aviation units.<sup>9</sup>

The SU-25 Frogfoot, although not a counter-air fighter, is equipped for close air support operations and it has been seen working with attack helicopters in Afghanistan.<sup>10</sup> In the close air support arena, the SU-25 could be expected to shoot at a target of opportunity or to defend itself or its attack helicopters. While it is unlikely that theater airlift aircraft would be specifically targeted by these fighters, they could become a target of opportunity.

Soviet attack helicopters now have enhanced combat capabilities. The Soviets have fully integrated them into the close air support role. They acknowledge what the West considers standard attack helicopter roles like securing flanks, anti-tank support, and as a mobile reserve. They also plan to use them in a hunting or search and destroy mode in enemy territory.<sup>11</sup> The primary role for Soviet attack helicopters is close air support and anti-tank, with a recently added air-to-air capability. The Soviets now seriously address the need for helicopter air-to-air weapons. Two new helicopters, the Havoc and the Hokum, have appeared with air-to-air systems.<sup>12</sup> The role of the helicopter in

aerial combat is undetermined, but it is unquestionable that it will occur. A look at the primary attack helicopters will show their threat potential across the spectrum - including to theater airlift aircraft.

The current Soviet attack helicopters are the Mi-24 Hind and the Mi-8 Hip, but the Hip has not been seen with air-to-air armament. The two newest combat helicopters are the Mi-28 Havoc and the Hokum. The Hind is armed with anti-tank missiles, rockets, and cannons.<sup>13</sup> It is also equipped with infrared sighting devices, low-light-level TV, and a laser range finder.<sup>14</sup> The Havoc is being armed with air-to-air missiles in addition to its anti-armor systems.<sup>15</sup> All together:

"...the Mi-28 has an avionics system permitting it to operate by day and night and in poor weather against ground and airborne targets, principally armoured vehicles and helicopters or slow-flying aircraft." <sup>16</sup>

The Hokum, however, is a new category of helicopter.

A revolutionary system in helicopter combat, the new Hokum is armed with air-to-air missiles and cannons. It is being said that the Hokum "may give the Soviets a significant rotary wing air-to-air combat capability." <sup>17</sup> Its speed, from hovering to 350 kilometers per hour<sup>18</sup> and armament leaves it open for a wide variety missions. Escort and protection is inevitable, but its role as a hunter and its specific targets, is open to speculation and only limited by the imagination. That such a system poses a threat to a broad range of friendly aircraft is obvious. It does not seem unreasonable that, in light of its weapons and helicopter capabilities, the Hokum could be sent to



## VI. Aerial Engagement Scenarios

Theater airlift missions in a combat zone would follow a relatively constant pattern for standard operations. The aircraft would be based well to the rear at a regular airfield with fixed facilities and an integrated defense system involving air and ground elements. Missions would originate at this field and proceed to the forward areas to conduct, or stage for, combat operations. Planning and coordination would be done as much as the mission and urgency permit. The airlift aircraft would fly in day, night, and most adverse weather conditions. Routes and altitudes would vary with these conditions and the threat.

Combat missions could start either at the main or a forward field. A tactical route would be flown to an airlanding, airdrop, or extraction delivery and then return. Multiple short duration mission are likely in forward areas with mission termination at the main base. Therefore, most theater airlift aircraft would spend the majority of their mission day in a higher threat area rather than at their home base. They would be exposed to a variety of threats with vulnerability varying based on proximity to the FLOT.

Airlifters, like any aircraft, are vulnerable to aerial combat action in the takeoff and landing phase. Whether at the main base or a forward airstrip, an aircraft in those phases is slow, configured, and relatively unmaneuverable until the configuration can be cleaned up. A theater airlift aircraft presents a steady target for hostile fighters during that time.

In the Soviet concept of a distinct air operation, destruction of airfields and aircraft on the ground is a high priority mission.<sup>1</sup> Escort fighters for the strike force could target airlift aircraft flying near the field just as the strike aircraft would target them on the ground. Although we protect our airfields and this should be considered a relatively low air threat area, the threat from a hostile strike cannot be ignored.

The enroute segment of any theater airlift mission is similar, except for individual aircraft differences, if the mode of delivery takes it into a forward combat area. Aircraft will fly at higher altitudes until reaching a combat entry point where the crew sets the aircraft for combat operations. Single ship or in formation, the aircraft descend to tactical altitudes below 500 feet, except at night or in adverse weather where those altitudes go up for safety. As the mission proceeds forward on the ingress the aerial threat would increase with proximity to the FLOT. Given the Soviet concept of airstrikes in depth and for using counter air fighters throughout the aerial battlefield, a potential threat exists. Single and multi-ship elements are particularly vulnerable to attack by fighters with a look-down/shoot-down system.

In any airland, airdrop, or extraction operation, the run-in and delivery phase is the most critical and the most vulnerable. Again, the more forward the target area, the higher the aerial threat level. The tactical ingress to the drop is flown to minimize exposure to threats, but once on the run-in an aircraft or a formation flies straight and level, on a fixed altitude, and

at a slow airspeed. The run across the drop zone or into an airstrip is the most intense for the crew as they concentrate on making an accurate delivery. During this phase, which ranges from under 5 to around 20 miles depending on the number of aircraft and the type of formation (visual or instrument), any available fixed wing escort would have to stand off due to the slow speeds involved.

In far forward areas and with the possibility of intermixed forces, Soviet attack helicopter encounters are a distinct threat. Logic dictates that, armed with air-to-air missiles, they would engage a slow moving aircraft or formation dropping supplies or equipment to the hostile force. Here the airlifters could either be a target of opportunity or specifically targeted.

Airborne operations include the previous vulnerabilities to air-to-air systems and add additional target value because of the nature of the force being dropped. Normally, Airborne forces do not deploy in a force small enough for one aircraft, so a formation would be the norm in most cases. The logic of destroying this type of force in the air rather than on the ground is inescapable. Again, the formation would try to reduce its vulnerability on the ingress, but once committed to the run-in and drop, it loses virtually all flexibility. The same constant speed, heading, and altitude in an area where airborne forces are most likely to be dropped again makes the aircraft potential helicopter targets. A hovering or moving helicopter could easily track and fire on a big aircraft unintentionally

making itself a target. A combined attack, using forces to draw off any escort and a different element to hit the airlifters, would be in keeping with the Soviet practice of fixed-wing fighters working with attack helicopters.<sup>2</sup>

Another significant point with airborne forces is that they normally go into high threat areas. They are a fighting force with limited ground mobility, so their deployment would be very near to where they plan to fight. That could be in a forward combat area to counter a major threat or a deep operation beyond the FLOT. Those are all areas where a significant air threat is likely, both from attack helicopters and from fixed-wing fighters. It is highly unlikely that the Soviets would ignore an airborne operation in any of these locations. Although an airborne operation over enemy territory would require an integrated air effort for success, it would also receive significantly more Soviet attention. An air effort to counter our operation clearly provides the most immediate response available. Theater airlift aircraft would not only be vulnerable, but specifically targeted.

The area of the battlefield where theater airlift missions are conducted affects the threat level and subsequent vulnerability of airlift assets. Operations in support of the Main Battle Area are clearly in a high aerial threat environment with a significant part of that being from attack helicopters. Deep operations go into an extremely high threat area just by being on that side of the FLOT, concentrated and layered air defense systems, and the nature of that kind of operation. It would not be routine and we can certainly expect the Soviets to

make some effort to counter or stop it altogether. Rear area operations would normally be mainly logistics missions in a relatively low threat environment, with an occasional Soviet fighter as the possible threat. However, with the advent of the OMG, or even large scale air assault operations, theater airlifters could encounter a high threat environment.

Besides normal rear area airlift missions, theater airlift aircraft in support of rear combat operations could be exposed to aerial combat. A large enemy air assault force well in the rear would be put in by air which would have its own escort in the form of attack helicopters or fighters. A large enough air assault force, or an OMG, would have its own internal air support in the form of a fixed wing fighter/attack helicopter combination.<sup>3</sup> A response to that force could include a significant ground or airborne force. Airborne forces would be dropped in by theater airlift aircraft. In such a rapid reaction situation, aerial resupply or reinforcement using any of the delivery modes would provide both agility and maneuverability for our forces. Soviet organic air support would attack theater airlift aircraft to destroy or disrupt Airborne forces or resupply efforts to our forces.

Deep operations forces, either projected or stay-behind, will need airlift support if they are to last any length of time. Projecting a deep force through airborne operations would clearly involve theater airlift aircraft. They would be subject to the threat of interception on both ingress and egress, and also in the

actual airdrop phase as described earlier. Their being targeted, either beforehand or in reaction to the operation, by air action is clearly probable since a significant threat to Soviet operations is being projected. For an air assault, stay-behind, or encircled force, resupply by parachute, as in the Khe Sanh<sup>4</sup> airlift, is a major consideration.<sup>5</sup> Theater airlift aircraft would be extensively involved in such operations. Any operation beyond the FLOT will require extensive coordination and suppression of enemy air. But the air-to-air helicopter adds a previously unaddressed factor in this equation and that threat must be considered strongly.

Any high value, high risk theater airlift operation could be optimized by performing it either at night or in bad weather. All three major Air Force theater airlift aircraft have precision delivery guidance systems, either inertial guidance or radar, and formation positioning equipment for operations in these conditions. Night and adverse weather optimizes those theater airlift capabilities, but not without cost. Those same conditions would severely limit the ability of current fighters to provide anything but high altitude or area protection. At the same time, the Mi-24 and the two new Soviet attack helicopters have a night, bad weather capability. The very nature of a helicopter allows it to fly in very marginal weather because it can move cautiously. Tied to a weapon system that allows it to pick targets in poor visibility conditions, the helicopter becomes a deadly threat to theater airlift aircraft trying to make the best use of their capabilities.

A prime scenario for such a situation would involve a 6-ship formation of theater airlift aircraft carrying an airborne force to drop in a Soviet rear area. It would be at night with rainy weather in the drop area, 200 foot ceilings and visibility not more than 1/2 mile. Not much would be flying in the low altitude environment on such a night, but Soviet radar could pick up the formation, both as a radar return and because the formation equipment on board airlifters transmits data to do its job. Launching fighters to engage the fighters flying high cover for the formation, the Soviets also launch several flights of Hokums and start directing them to an intercept. Once in the general area the Hokums would begin searching with their passive infrared or low-light TV systems, saving the radar for a clear target and shot. Once the airlifters slow to set up the drop, the Hokums could easily match their speed and, using active radar, launch multiple air-to-air missiles at the unsuspecting transports. Any aircraft not immediately destroyed could be engaged from close range with cannon fire. The chances of survival would be very slim. Impossible? Consider deep operations, Soviet capabilities, and what we know about the Hokum.

Although a limited asset, theater airlift aircraft can likely be found throughout the combat zone performing a wide variety of missions. There are presently 575 C-130's<sup>+</sup> of all models in service. In a mid-to-high intensity environment many of those would be needed in the theater to support the mobility and logistics efforts on the battlefield we envision in the future.

To ignore the potential air-to-air threat to these valuable aircraft is to not only threaten the missions they perform, but also to endanger their valuable crews, passengers and cargoes.



## VII. Conclusion

"Commanders must identify and...counter enemy threat capabilities to further enhance combat...force capability." <sup>1</sup>

The answer to the question whether or not Soviet air-to-air systems pose a threat to theater airlift aircraft is clearly affirmative. Although these aircraft are distinctly vulnerable in various phases of a given mission and drop mode, a serious direct threat is only present in a portion of these operations. The threat, however, does increase with both the importance of the mission and the proximity of the critical mission phase to the enemy.

Clearly the Soviets will target theater airlift assets. They are unarmed, relatively slow aircraft which play a major role in sustainment, emergency resupply, mobility, and airborne operations on the AirLand battlefield. Although there are no recent precedents for the Soviets to follow in this respect, they effectively targeted German airlift aircraft trying to support Stalingrad and we can expect a greater, more sophisticated threat today.

The threat posed by Soviet combat aircraft, including fighters with look-down/shoot-down capabilities and air-to-air capable attack helicopters, is very real and potentially devastating. Since air superiority is strongly emphasized by both opponents, dedicated escort is less likely than operations under a general air umbrella. Therefore, both chance encounters and specific targeting of theater airlift aircraft seems inevitable.

Without some warning equipment and either passive or active defense measures, those aircraft can become unknowing targets.

There are a number of options available to protect theater airlift assets, but those can only be discussed briefly here. A radar warning system would alert the crew to both ground and air radar threats and an on-board or escorting jamming system would assist in close-in defense. Passive defensive measures, such as flares, chaff, and infrared suppression systems could make missile kills a much smaller probability. A compatible dedicated escort aircraft would be ideal, but is also highly unlikely since it would be too specialized in today's environment of multiple mission requirements for aircraft.

A serious consideration for an active defensive system would be to equip theater airlift aircraft with a lightweight air-to-air missile system, such as a modified Stinger. Targets that shoot back make bad targets of opportunity and they make very challenging designated targets. As "Hap" Arnold and Ira Eaker noted about transports in 1941, "The war of the future...points toward a new factor and that is the necessity for providing protective armor and armament for this type." <sup>2</sup>

In conclusion, the Soviet systems discussed here in conjunction with theater airlift vulnerabilities make it apparent that there needs to be a greater effort made to preserve those assets. With the advent of the C-17, theater airlift aircraft will be even more sophisticated, capable, and expensive. We cannot afford to ignore serious potential threats to this capability. Theater airlift serves both the Army and the Air

Force in combat, combat support, and combat service support roles. It enhances the ground commander's agility by providing rapid movement of troops and equipment. It helps him maintain his initiative by providing flexibility. It allows him an aspect of depth by providing the capability to emplace or sustain deep ground forces. Finally, theater airlift enhances synchronization by providing the ability to shift reserves or reinforce a needed unit or aid in an economy of force operation, to name a few. Theater airlift is an integral part of the Army-Air Force team in AirLand Battle. A threat to its ability to carry out its mission is a threat to a major asset employed in AirLand Battle. That threat must be considered, but more importantly, solutions must be addressed.

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